CERTETA

RESEARCH CENTRE IN SHEET METAL FORMING TECHNOLOGY

Established in 2000

Certified CNCSIS in 2002

Director: Prof. Dr. –Ing. Dorel BANABIC

- Material behavior of metalic materials
- Simulation of sheet metal forming processes
- Design of sheet and tube metal forming technologies
- Experimental techniques in material forming
- Virtual fabrication

Competences

- Research team:

- Professors: 5
- Readers: 4
- Lecturers: 2
- Postdocs 4
- PhD students: 10

Human resources

- Tension-compression testing machine Zwick Z150(150 kN) with testeXpert II
- Tension-compression testing machine INSTRON (400 kN) with testeXpert I
- Strain measurement system ARAMIS (GOM)
- Hydro-mechanical devices for the determination of FLD´s (100 and 200 mm)
- Hydraulic press for deep drawing with the control of the blank-holding force „Benedetti HPS 100“ (1000 kN)
- Erichsen Universal Sheet Metal Testing Machine, Model 142-20

Experimental facilities

Erichsen deep-drawing device

ARAMIS System

Zwick tensile testing machine

Instron tensile testing machine

Benedetti press

Panoramic view of the CERTETA laboratory

Representatives research projects

- 2006 - 2008 ***Improving of the performances of the sheet metal forming simulation in virtual forming fabrication by using new constitutive material models,*** CEEX Postdoc Program, Contract no. 1539/2006.
- 2006 - 2008 ***Integrated platform for the simulation of forming processes in virtual manufacturing (VIRFAB),*** CEEX Complex Program, Contract no. 1683/2006.
- 2007 - 2009 ***Stochastic modelling of the Forming Limit Curves. A new tool for increasing the robustness in the simulation of the sheet metal forming processes*****,** CNCSIS, Contract no. 2930/2006
- 2007 – 2010 ***Modelling of the Forming Limit Bands, a new tool of the virtual fabrication in the sheet metal forming processes*****,** PN II-Ideas Program
- 2008 – 2010 ***Advanced models for the description of the plastic anisotropy and formability of thin metallic sheets***, PN-II Human Resources- Excellences Projects for Researchers Reintegration
- 2010 – 2013 ***From micro to macro - continuum scale modeling of advanced materials in virtual fabrication*****,** Complex Exploratory Research Projects PCCE, PN II-Ideas Program

Internal research projects

- 2003-2008 ***Realization of a function BBC_PARAMS for computing the parameters of the BBC2003 model out of given material data. 3D extension of the BBC2005 yield criterion***
  Financed by AutoForm Engineering GmbH, Switzerland.
- 2004 – 2008 ***Virtual Intelligent Forging****-CA* within the framework *FP6 Financed* by European Community, Contract no. NMP2-CT-2004-507331.
- 2005 – 2008 ***Sheet metal formability for special metal forming processes***,Joint research project between *Institute for Metal Forming Technology, Stuttgart University* and *CERTETA*, Financed by Humboldt Foundation, Germany
- 2005-2008 ***Improvement of performances of formability models for sheet metals using new constitutive laws,*** Joint research project between *Institute of Virtual Manufacturing, ETH Zurich* and *CERTETA*, Financed by Swiss National Foundation
- 2009-2013 ***Virtual Factory Framework,*** FP7 Collaborative Project - Large-scale integrating project, FP7-NMP-2008-LARGE-2

External research projects

Technical University of Cluj Napoca
Department of Manufacturing Engineering

The impact of the scientifical results and the international visibility of CERTETA center

CERTETA center is the headquarter of the European Scientific Association for Material Forming

ESAFORM

www.esaform.org

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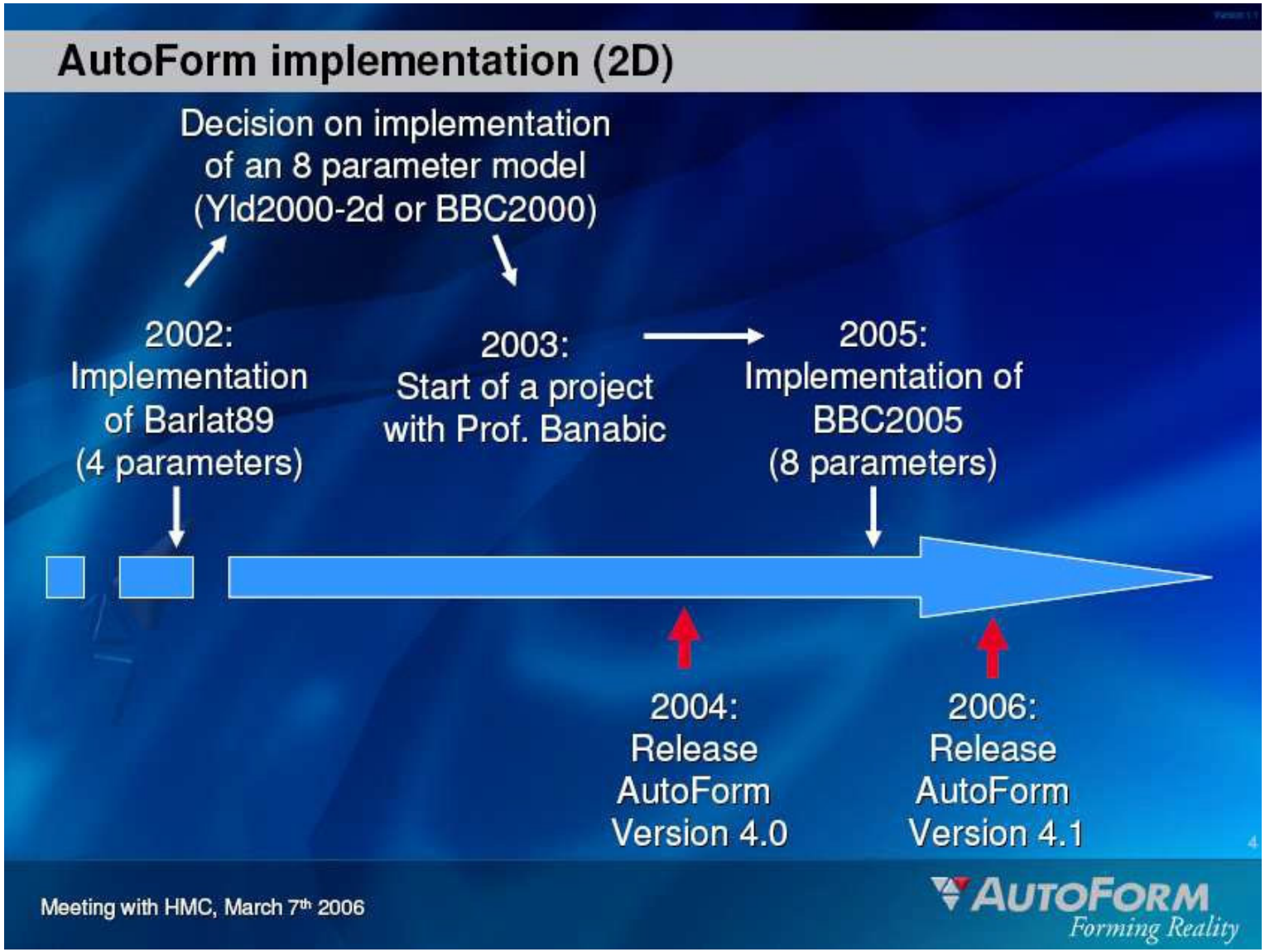

Material data user graphic interface in the AUTOFORM 4.1 FE commercial code

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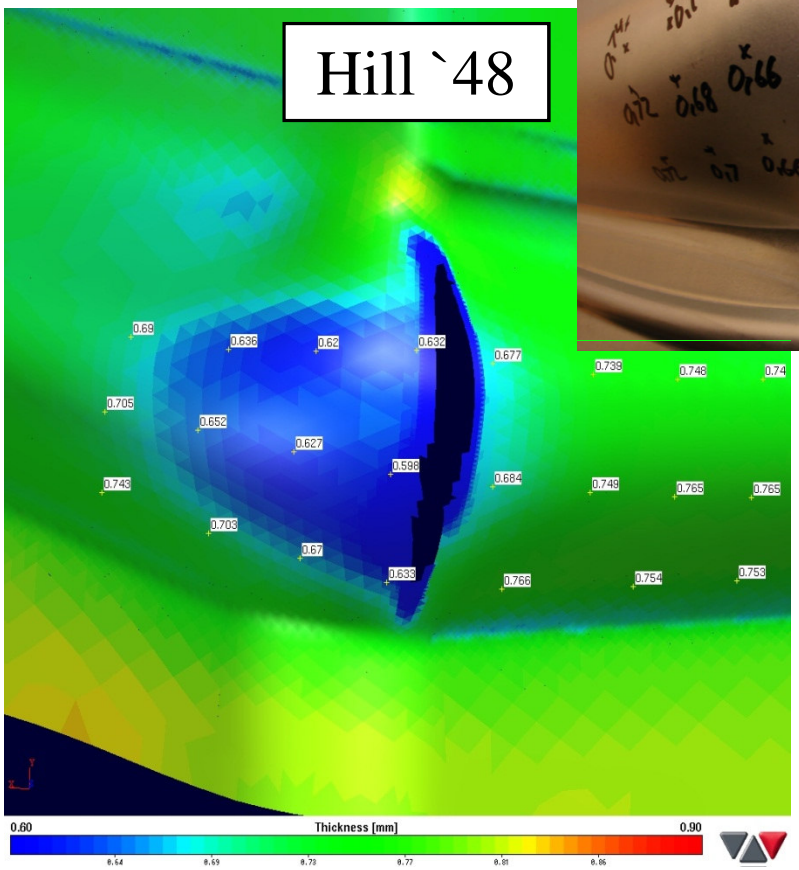
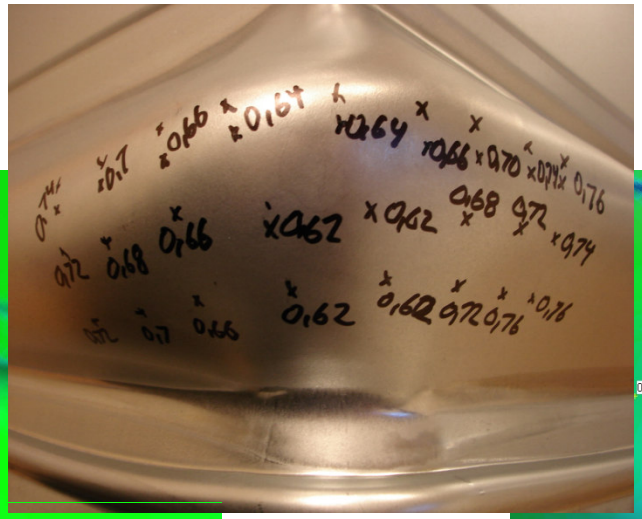
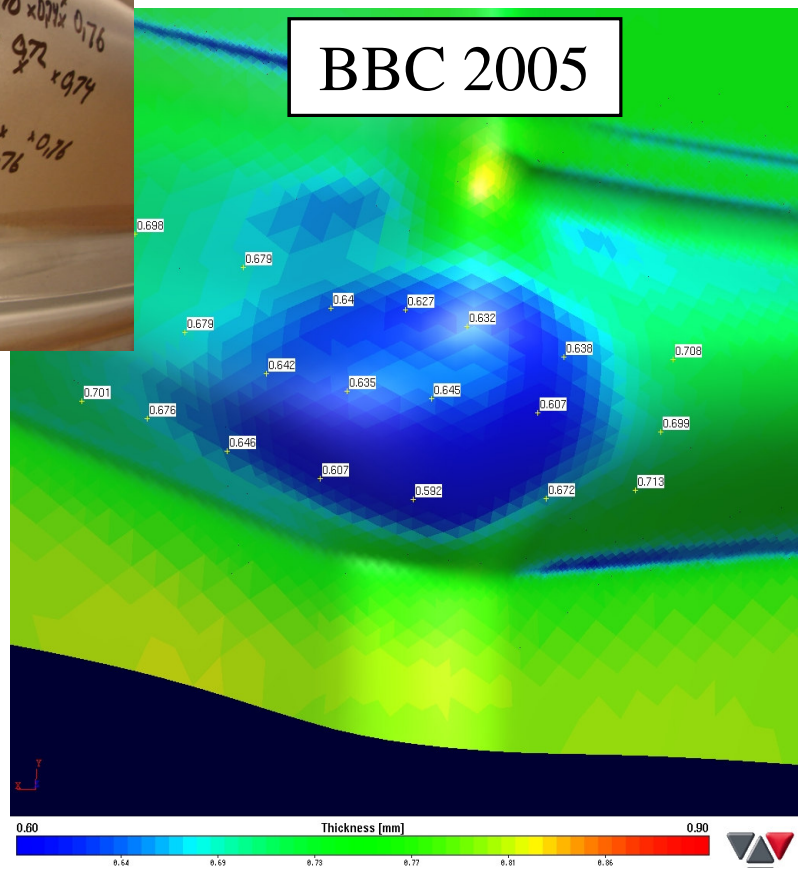
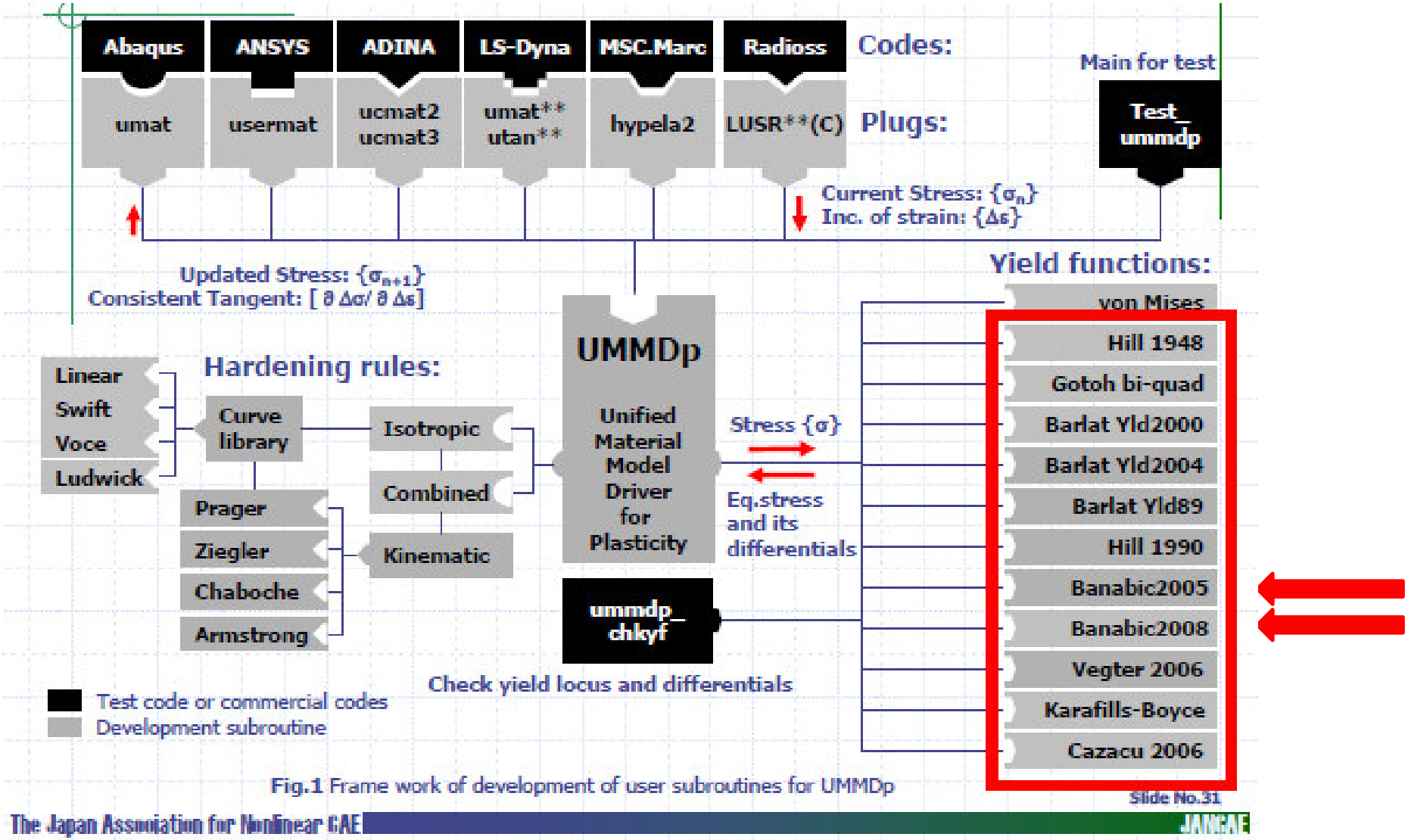






Sigvant, Dec. 2007

Simulations of production part from VOLVO V30 using H180BD steel (Corus)

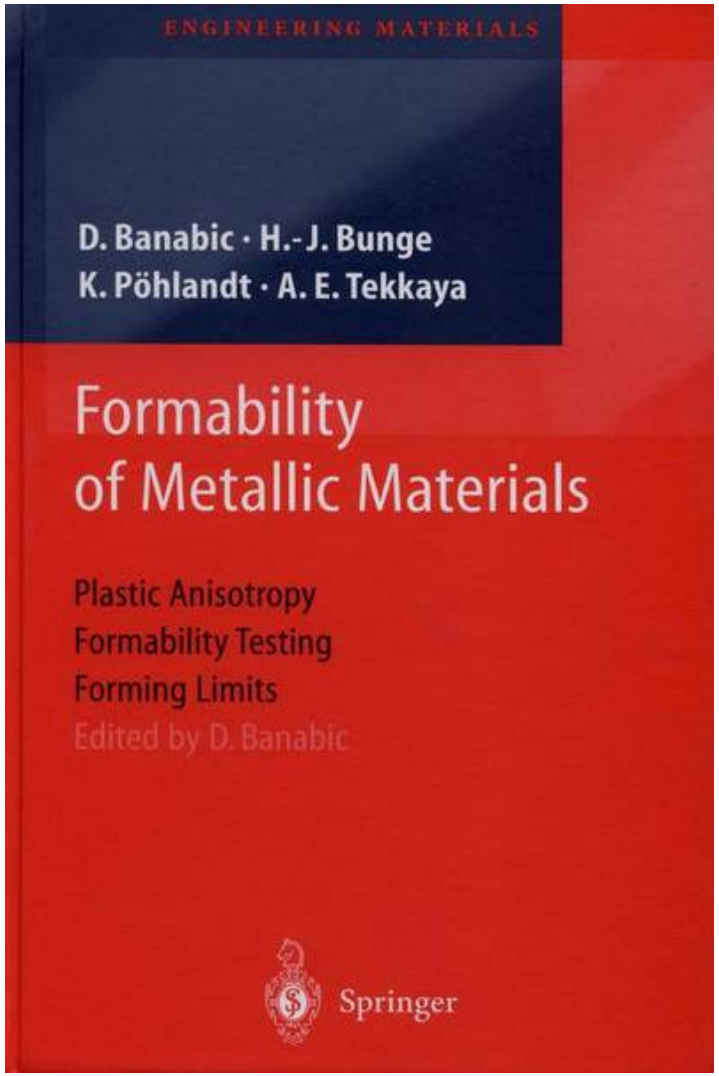


UMMDp platform developed by the Japan Association for Non-linear CAE

The most representative publications of the past 5 years

- **4 books published in international publishing houses (Springer and Hermes-Lavoisier)**
- **6 contributions in books published in international publishing houses (Springer and Wiley)**
- **3 books in national publishing houses**
- **56 papers in high cited international journals**
  (International Journal of Plasticity, International Journal of Mechanical Sciences, CIRP Annals, Journal of Material Processing Technology, Metallurgical and Metals Transactions, Journal of Mechanics and Physics of Solids, European Journal of Mechanics, International Journal of Material Forming)

The most representative publications



Contents

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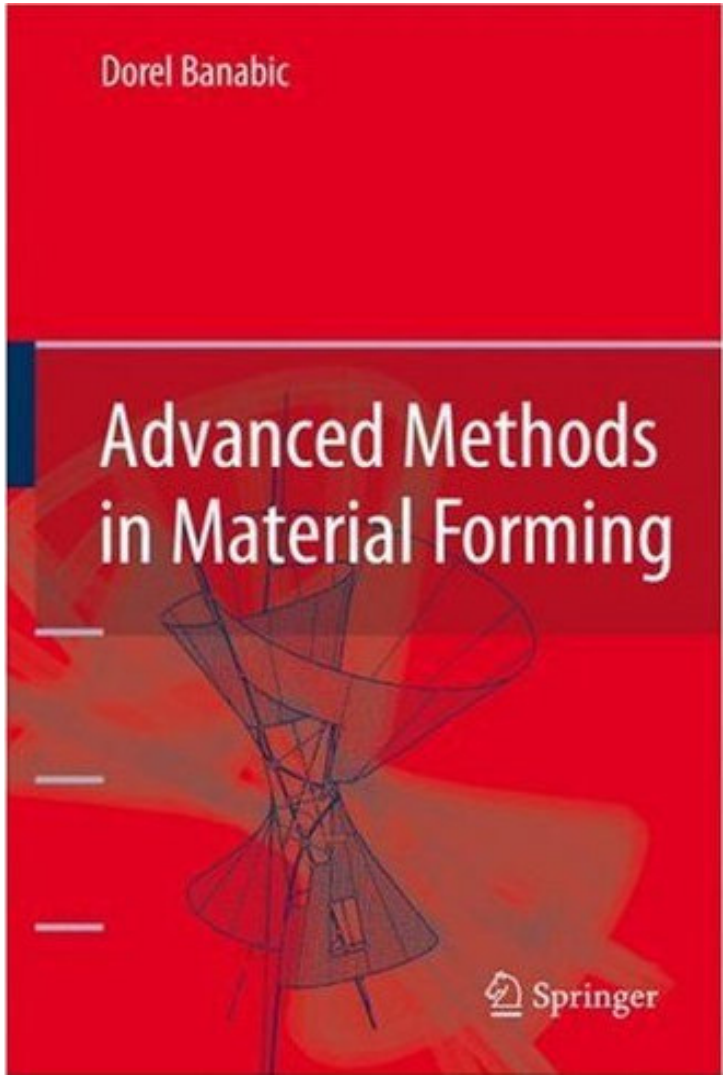
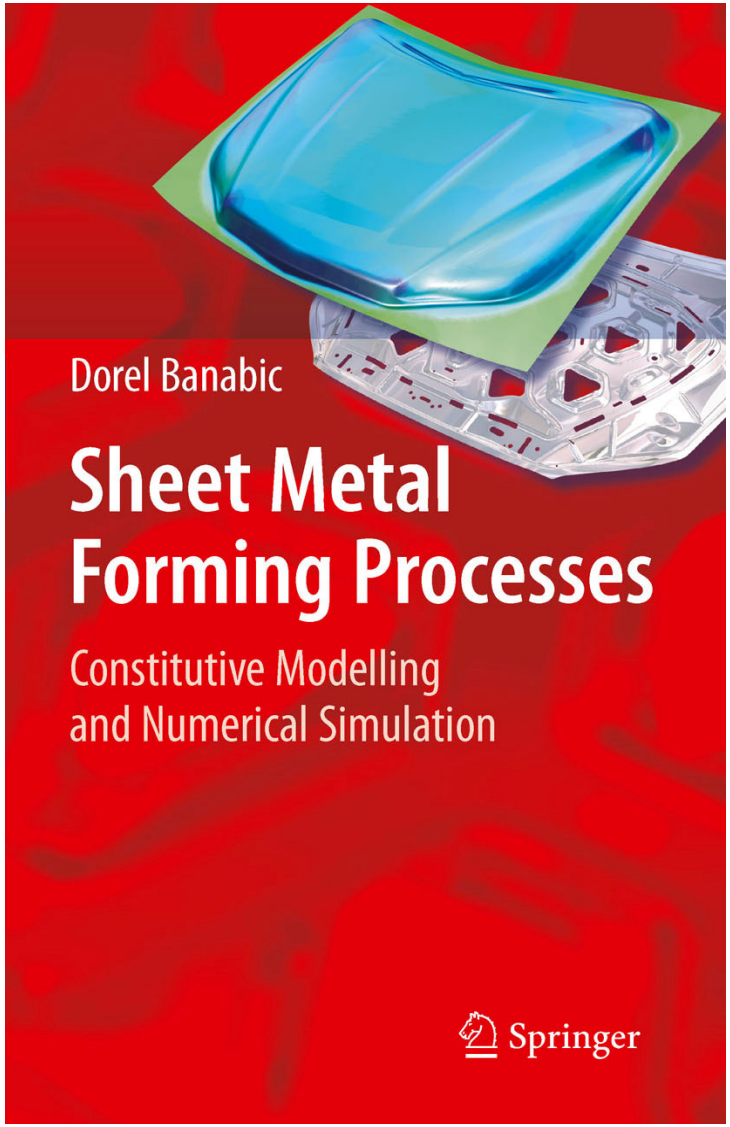


Contents

- New and advanced numerical strategies in forming process simulation;
- Sheet metal forming technologies and modeling;
- Anisotropy and formability of materials;
- Polymer processing and modeling;
- Composite forming technologies and modeling;
- Superplastic forming.



Co-authors from:

- ETH Zurich, Switzerland
- Goteborg University, Sweden
- Autoform Co., Zurich, Switzerland
- Volvo Co., Sweden

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To be published in 2013

- **University of Stuttgart, Germany**
- **Tokyo University of Technology, Japan**
- **POSTECH University, Korea**
- **Catholic University Leuven (KUL), Belgium**
- **ETH Zurich, Switzerland**
- **Technological University of Harbin, China**
- **AUTOFORM Co., Zurich, Switzerland**
- **Daimler Co., Sindelfingen, Germany**
- **Renault Technocenter, Guyancourt, France**
- **Virtual Vehicle, Graz, Austria**

International colaborations of CERTETA

www.certeta.utcluj.ro

CERTETA web site